Advancing Climate Science & Services at NOAA's Climate Program Office

INFORMING DECISIONS

OBSERVATIONS & MONITORING

UNDERSTANDING & MODELING

Wayne Higgins
Director, Climate Program Office

October 2013

Outline

Demand for Climate Information

NOAA's Climate Goal Strategy

CPO Programs, Accomplishments, Competitions

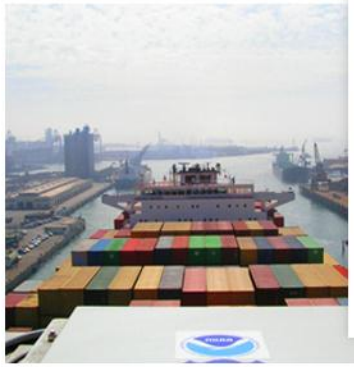
CPO Near Term Priorities

Challenges and Opportunities

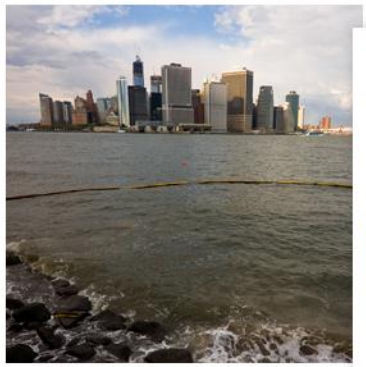
Takeaways

The Rising Demand for Climate Information

COMMERCE



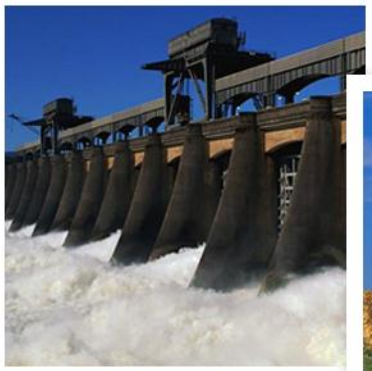
COASTS



RECREATION

ECOSYSTEMS

THERE IS AN URGENT AND GROWING NEED FOR RELIABLE, TRUSTED, TRANSPARENT, AND TIMELY CLIMATE INFORMATION ACROSS ALL SECTORS OF OUR ECONOMY.



HYDROPOWER

FARMING

HEALTH

PRIVATE SECTOR

NOAA Strategic Plan

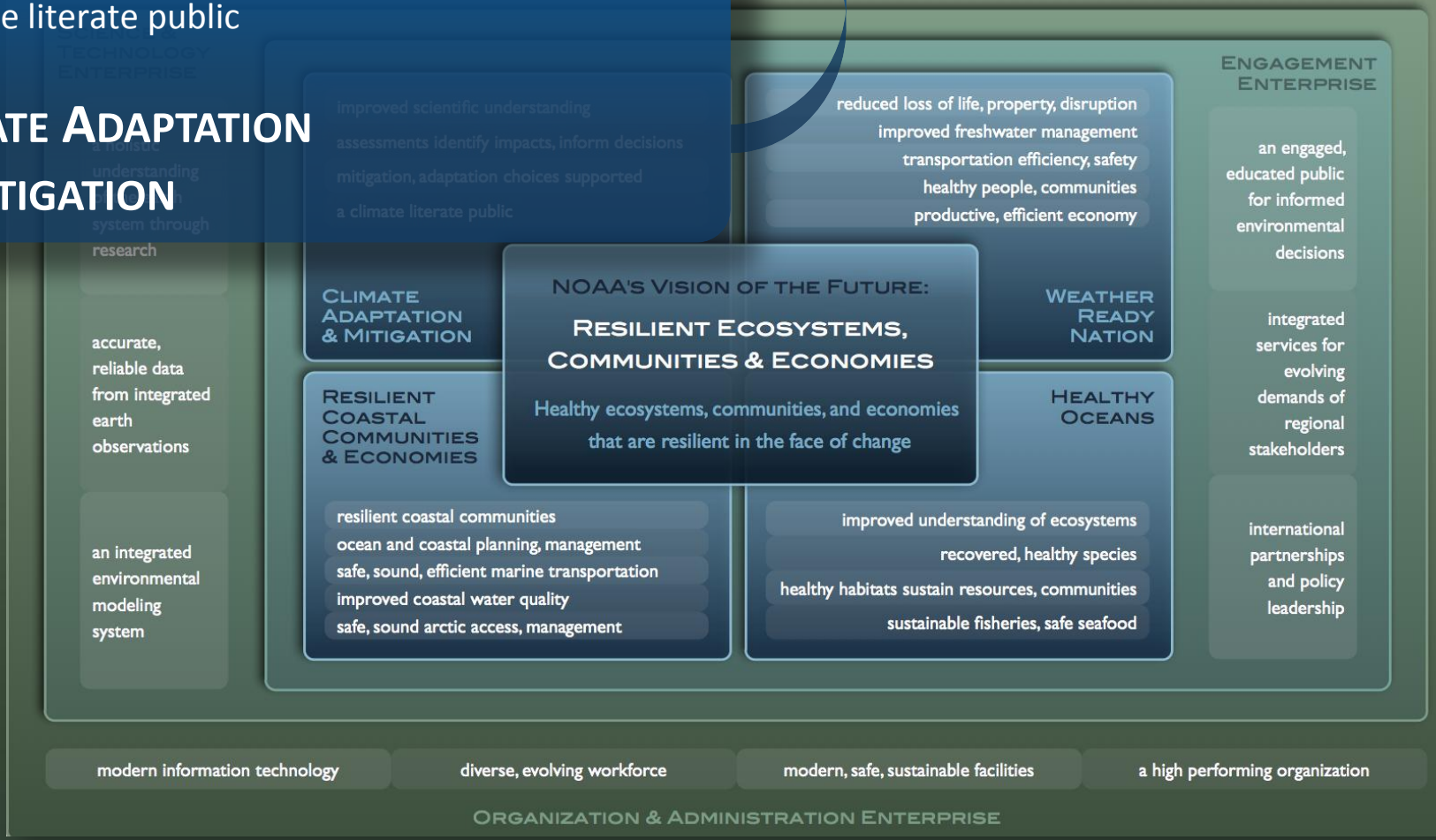
improved scientific understanding

assessments of impacts to inform decisions

climate services to support mitigation, adaptation

a climate literate public

CLIMATE ADAPTATION & MITIGATION



Climate Goal Structure

AA Climate Goal Board
Robert Detrick, OAR [Chair]
Mary Kicza, NESDIS
Louis Uccellinni, NWS
Holly Bamford, NOS
Paul Doremus, NMFS
Pat Montanio, PPI

Climate Goal Strategy Lead
Wayne Higgins, Director, CPO

Executive Director: Amanda McCarty
Secretariat: Colin Quinn, Laura Hamilton, Neil Christerson

Climate Board Action Committee

NOAA'S CLIMATE GOAL:

AN INFORMED SOCIETY ANTICIPATING AND RESPONDING TO CLIMATE AND ITS IMPACTS

Objectives:

- Improved Scientific Understanding
- Assessment Services
- Mitigation and Adaptation Services
- Climate Literacy

Societal Challenge Projects

- Sustainability of Marine Ecosystems
- Coasts and Climate Resilience
- Climate Impacts on Water Resources
- Weather and Climate Extremes

Climate Board Action Committee (CBAC)

The CBAC is the primary support body for the AA Climate Goal Board

CBAC membership includes:

- Climate Goal Strategy Lead (Chair)
- Executive Director (Vice-Chair) and Secretariat
- Line Office representatives appointed by the AAs
- "Societal Challenge" project leads
- Climate Goal Budget Lead

Functions:

- Formulate agendas for the Board (decisional framework)
- Provide follow-through on actions
- Enhance cross-LO prioritization, decisions, communication
- Develop plans and agreements
  (e.g.) Annual Operating Plans; Service Level Agreements)
- Collaborate with other NOAA bodies

NOAA'S CLIMATE GOAL: AN INFORMED SOCIETY ANTICIPATING & RESPONDING TO CLIMATE AND ITS IMPACTS

Climate Core Capabilities & Societal Challenges

Climate Societal Challenges

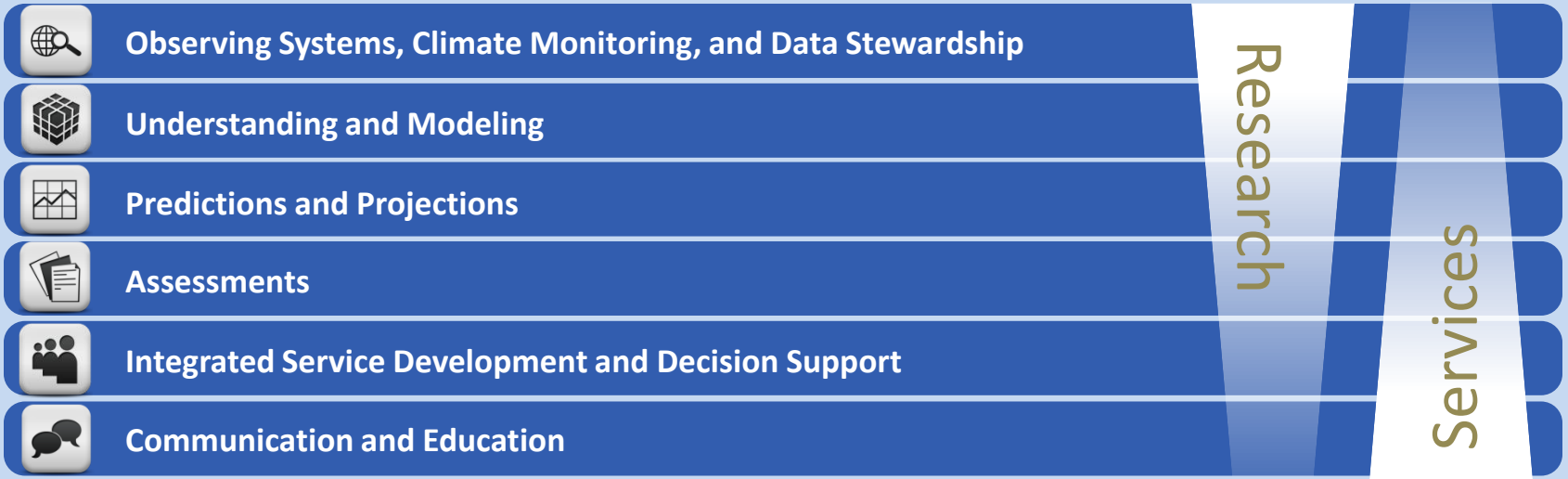
Initial climate science and services areas to meet private and public sector challenges

- Sustainability of Marine Ecosystems
- Coasts and Climate Resilience
- Climate Impacts on Water Resources
- Weather and Climate Extremes

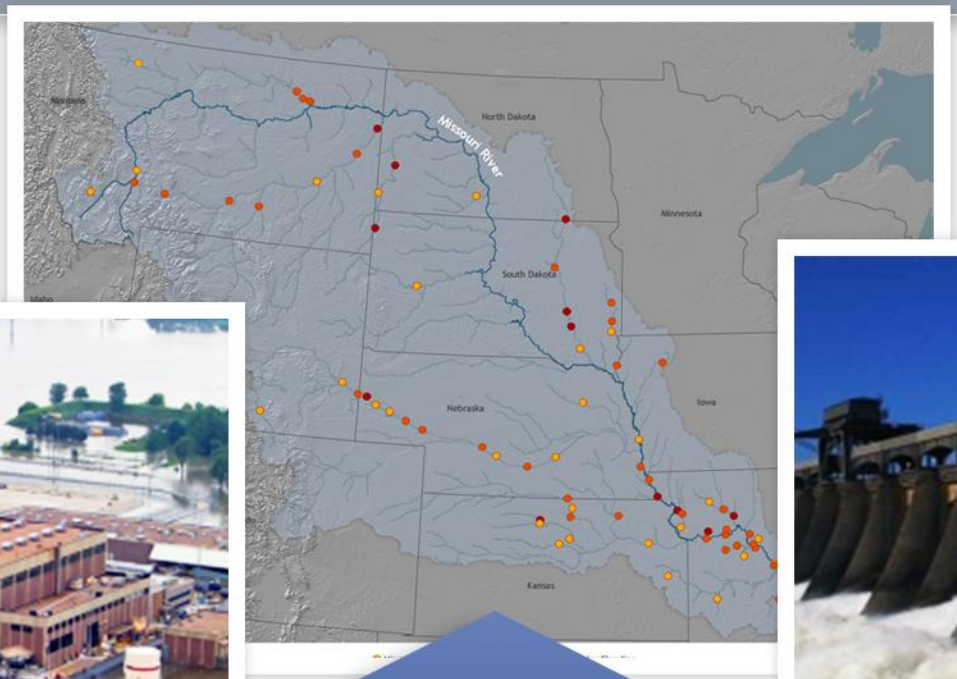
Partners

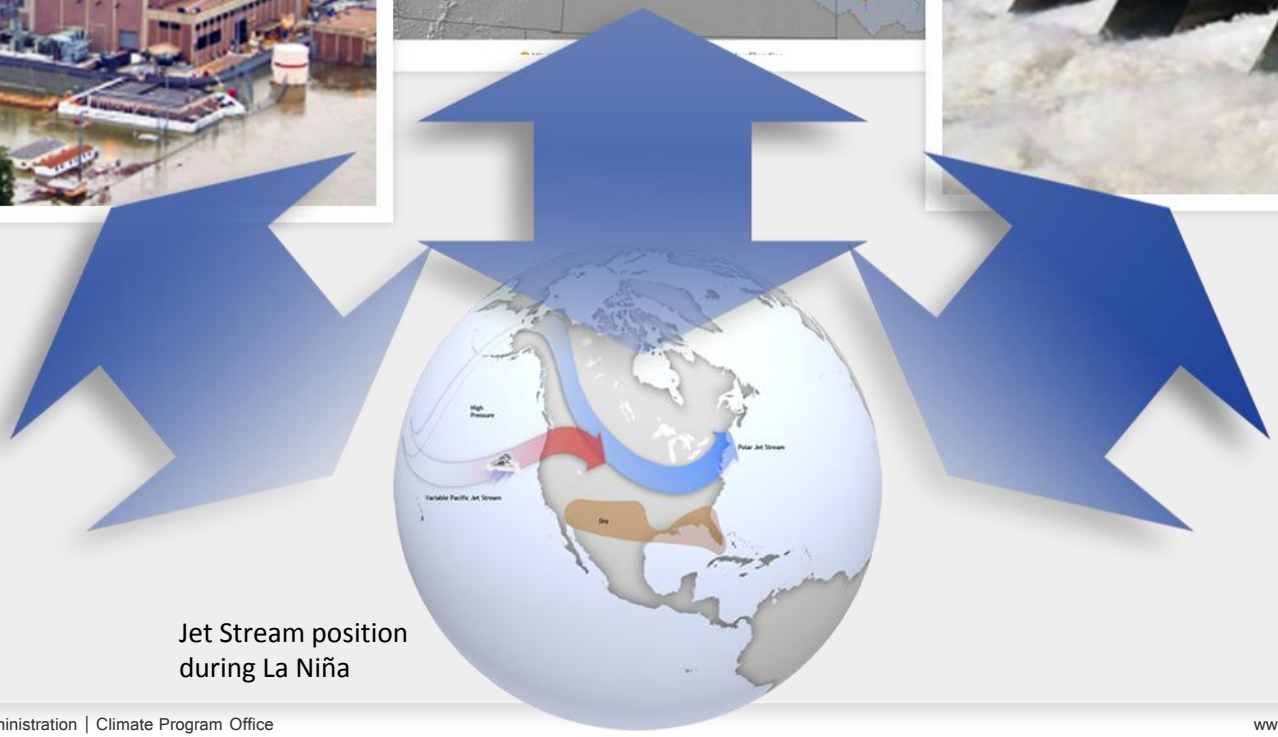
- International
- Federal
- DOC/NOAA
- State/Local
- Academic
- NGOs
- Private Sector

Climate Core Capabilities



Climate-Weather-Water Connection

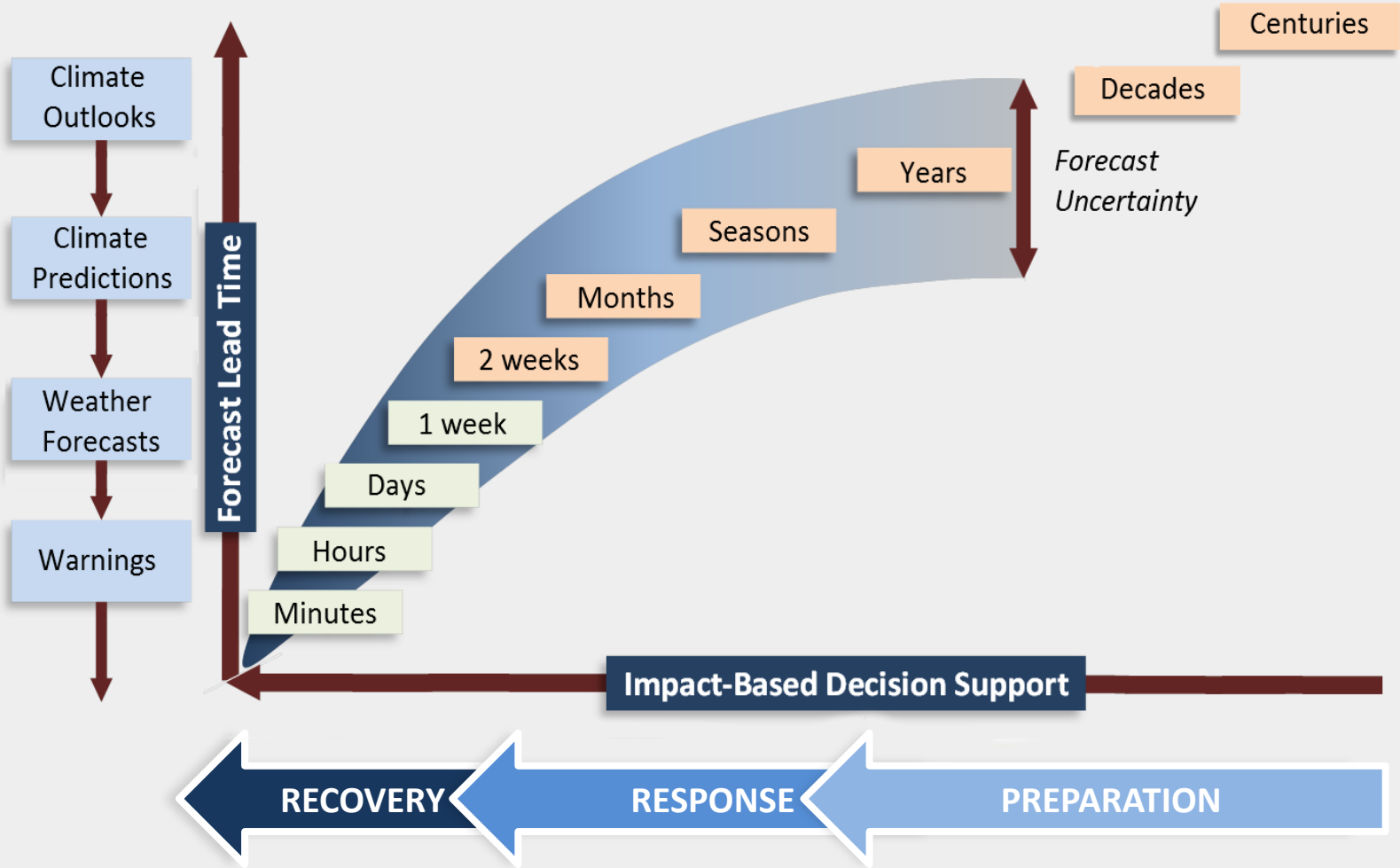




Jet Stream position during La Niña

Climate-Weather-Water Connection

Seamless Weather to Climate Prediction



Requires a collaborative forecast process and consistent messaging across timescales for decision support services

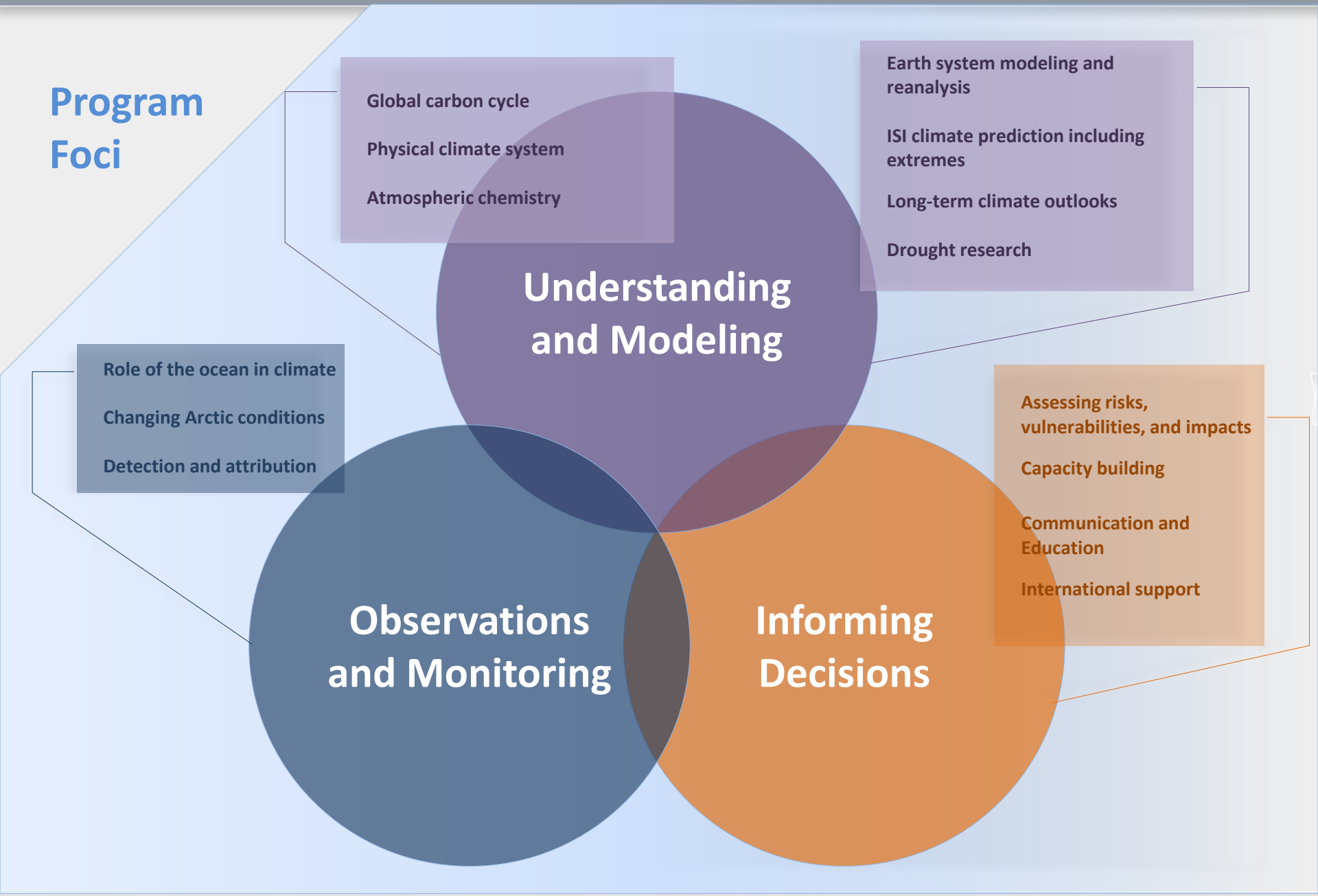
NOAA'S Climate Presence

NOAA works across scales (local to international), but most adaptation decisions are local or regional, and NOAA is structured to have multiple entry points at regional, state, and local levels. In addition to specific offices, our research cuts across all of these levels.

Many CPO efforts are external …. Drawing upon new ideas to improve NOAA capabilities. 50 Countries participate in global ocean observations.

NOAA Climate Program Office (www.cpo.noaa.gov)

Program Foci



NOAA Climate Program Office (Programs)

Wayne Higgins, Director

Climate Observations and Monitoring (COM) - designs, deploys, and maintains an integrated global network of oceanic and atmospheric observing instruments to produce continuous records and analyses of a range of ocean and atmosphere parameters for weather and climate.

Lead: David Legler

Earth System Science (ESS) – provides a process-level understanding of the climate system by engaging field observations, modeling and analysis to support the development of improved climate models and predictions.

Lead: Jim Todd

Modeling, Analysis, Predictions, and Projections (MAPP) – aims to enhance the capability to predict and project variability and change in Earth's climate system; focusing on the coupling, integration, and application of Earth system models and analyses.

Acting Lead: Annarita Mariotti

Climate and Societal Interaction (CSI) – provides leadership in developing interdisciplinary science and services, including assessments, for application in climate-sensitive sectors and regions.

Lead: Roger Pulwarty

National Integrated Drought Information System (NIDIS) - Provides dynamic and easily accessible drought information for the Nation. NIDIS is continually developing more robust services and regional decision support resources.

Lead: Roger Pulwarty

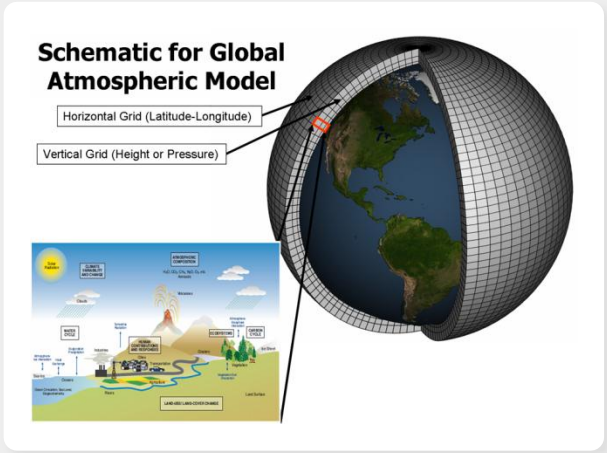
Recent CPO Accomplishments

Prototype Deep Argo float successfully tested to depth of 6000m

Released Climate.gov version 2.0. In FY2013, site visits increased 124% compared to FY2012.

Supported the first National Multi-Model Ensemble seasonal prediction prototype system involving all leading U.S. climate models, running real-time since 2011.

Recent CPO Accomplishments

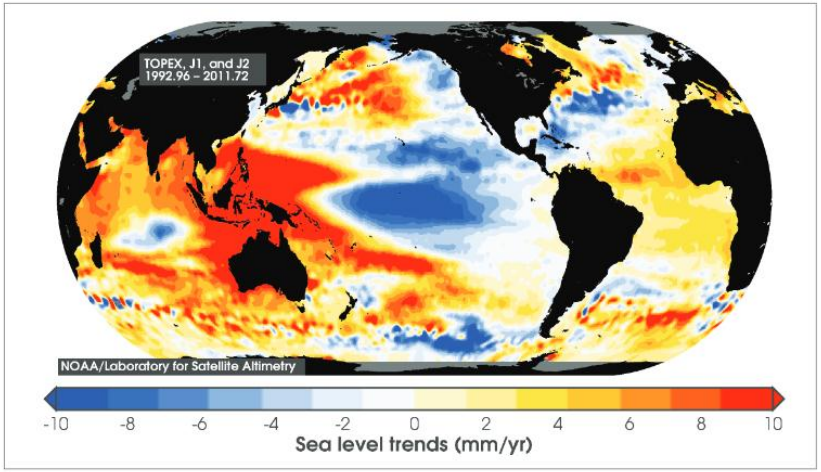


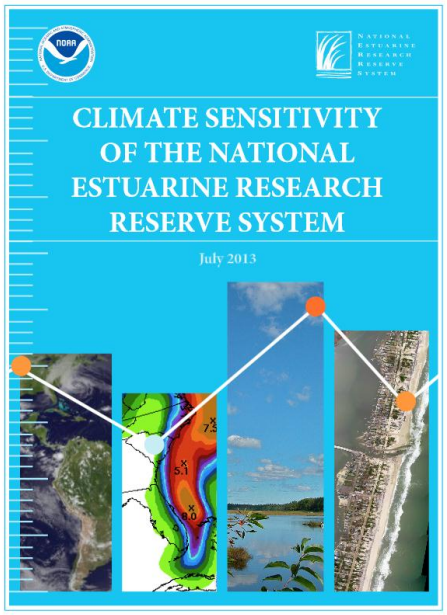
Organized 4 MAPP Task Forces engaging more than 120 scientists on climate prediction, projections, and drought research; over 500 attendees to MAPP's webinar series.

Fostered collaboration between GFDL and the extramural community to integrate the nitrogen cycle within GFDL Earth System Model.

Launched a successful partnership with U.S. AID to advance climate and society research in support of international development strategies.

Recent CPO Accomplishments





Led the development of the interagency report synthesizing state of the science on sea level rise and providing estimates for long-term sea level rise.

Organized strategies to understand decision challenges in building resilience to extreme events in partnership with national water utility organizations.

Supported the development of the NERRS Climate Sensitivity Analysis to inform integration of climate information into place-based stewardship and management.

FY2014 FFO Competitions

Climate Observations and Monitoring (COM)

1. *Data Sets and Indicators:* Data for, and analysis of, extremes; ocean climate indicators
2. *Paleoclimate Proxy/Multi-Proxy Reconstructions and Analyses:* Characterizing historical extremes

Earth System Sciences (ESS)

3. *Climate Variability and Predictability (CVP):* Improved Understanding of Tropical Pacific Processes, Biases, and Climatology
4. *AC4 - Observational Constraints on Sources and Sinks of Aerosols and Greenhouse Gases:* Emissions from oil/gas extraction; emissions in the Southeast; deposition processes

Modeling, Analysis, Prediction, and Projections (MAPP)

5. *Research to Advance Understanding, Monitoring, and Prediction of Drought:* Understanding predictability of past NA droughts; advancing drought monitoring/prediction
6. *Climate Test Bed – Research to Advance NOAA's Operational Systems for Climate Prediction*

Climate and Societal Interactions (CSI)

7. *SARP – Climate Extreme Event Preparedness, Planning, and Adaptation:* Resilience to impacts on water resources and related activities
8. *SARP – Coping with Drought Initiative in support of NIDIS:* Early warning pilots
9. *COCA – Ecosystem Services for a Resilient Coast*

Please watch http://www.cpo.noaa.gov/ for additional information on the FFO

Forces Shaping CPO Future

SAB Climate Working Group

- Scientific advice and direction
- Reports & recommendations

National and International Programs

- USGCRP
- IPCC
- GFCS
- WCRP
- GCOS

Rising demand for climate information

The Emerging Private Sector

President ’s Climate Action Plan

Internal Refocusing in NOAA

- Science Reviews (2005-2007)
- Climate Goal Reviews (2007-2009)
- Climate Service (2009-2011)
- NOAA Strategic Plan
  - SEE Process
  - Societal Challenge Projects

External Reviews and Advice

- The NAPA Review (CS options)
- The Barron Reports (NCS options)
- NRC Reviews and Reports

Needs to bridge basic, applied, and adaption research

CPO Near Term Priorities

CPO Vision, Planning, Follow Through

- Strategic Plan
- Tactical Plan (Roadmap)
- Annual Operating Plan

Advance Climate Goal Strategy

- AA Climate Board (Climate Goal Execution)
- Societal Challenge Projects
- Annual FFO

Engaging the Climate Working Group

- Action Tracker
- Site Visits
- Specific requests for advice
    - (FY14 Budget; FY16 Priorities, etc.)

Staffing Plan / Succession Planning

Why a CPO Strategic Plan?

To align with the OAR, NOAA, and DOC strategic plans

To strategize on how to address the increasing demand for climate services in a constrained budget environment

To serve as a basis for setting CPO priorities and manage expectations over the next 5 to 10 years

To provide the foundation to align planning, budget, and function and to link to performance through CPOs Annual Operating Plan

Some Challenges

1. How should CPO plan for and adjust its research enterprise to meet the increasing demand for climate information?

2. **Are CPO programs optimally aligned to support the NOAA climate societal challenges?**

3. What steps should CPO take to ensure long-term, high quality observations that undergird climate monitoring, research and services?

4. **How should CPO manage expectations for more and more given fixed (or even decreasing) resources?**

5. How should CPO embrace emerging technologies that improve the quality and exchange of climate information?

6. **How should CPO manage issues arising over demands for CPO services that could be provided by the private sector?**

7. How does CPO ensure required workplace skills?

Some Opportunities

Observations

- Developing a sustainable ocean observing system through testing of new technologies

Research & Development

- Arctic Research Initiative to improve understanding, modeling and prediction of a rapidly changing Arctic
- NOAA global modeling strategy that spans the weather to climate continuum

Services & Partnerships

- Reauthorization of NIDIS; value of a legislative mandate; opportunity for further congressional engagement
- Increased private/public sector awareness and engagement
- Interagency engagement (USGCRP)
- President's Climate Action Plan
  - Preparedness
  - Mitigation
  - International

Take Away's

CPO's Unique Value Proposition

- CPO supports and coordinates climate observations, research, and information for decision makers undertaken by NOAA's laboratories and centers, and it ensures these efforts are buttressed by science performed by the extramural research community through competitive grants and contracts.

CPO has a long record of major contributions to the climate community

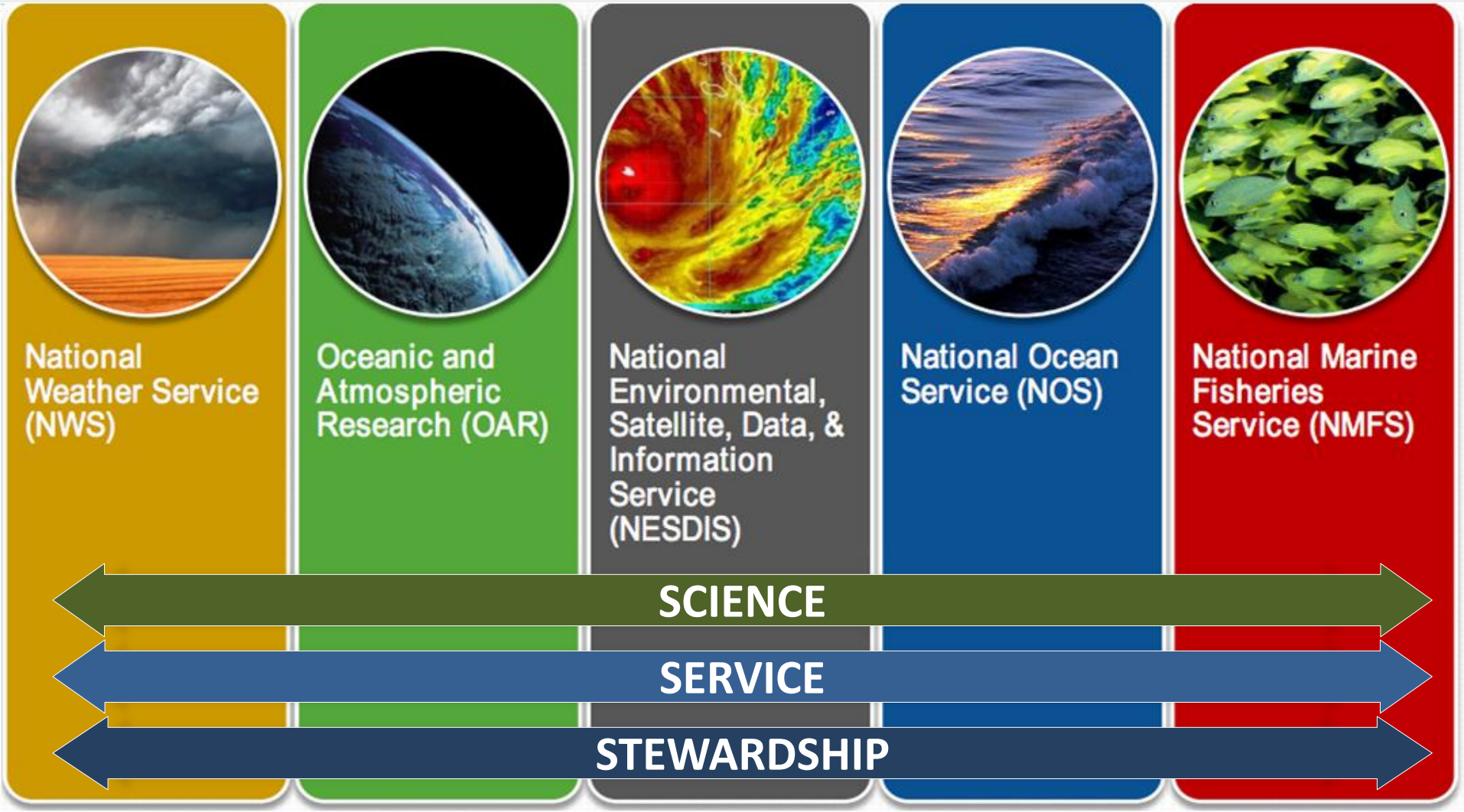
- Observations to build the climate data record & monitor climate
- Foundational research to advance understanding of the Earth system for improved predictions & projections
- Climate assessment and services development to inform decisions
- Annual FFO Competitions

CPO Near Term Activities

- Strategic Plan and improved Annual Operating Plan
- Increased private/public sector awareness and engagement
- Interagency engagement (USGCRP)
- President's Climate Action Plan

Extras

NOAA Line Offices



Climate Goal: An informed society anticipating and responding to climate and its impacts

Climate Goal Strategic Plan Objectives:

1. Improved scientific understanding of the changing climate system and its impacts

2. Assessments of current and future states of the climate system that identify potential impacts and inform science, service, and stewardship decisions

3. Mitigation, risk management, and adaptation efforts supported by authoritative, sustained, reliable, and timely climate information services

4. A climate-literate public that understands its vulnerabilities to a changing climate the benefits of using climate monitoring and applied research, and makes informed decisions

Climate Goal

AA CLIMATE GOAL BOARD
OAR
NESDIS
NWS
NOS
NMFS
PPI

NOAA Planning Process
Strategy Execution and Evaluation (SEE) Process
IPs, AGM, CPA, & Fiscal Guidance

Climate Goal Champion
Robert Detrick, AA, OAR

Climate Goal Budget Lead
Jason Donaldson, CFO, OAR

Climate Goal Strategy Lead
Rick Rosen, Acting Dir., CPO

Input from **SAB Climate Working Group** and **USGCRP**

Climate Goal Staff
(CPO/PPD):
Neil Christerson
Jennifer Faught
James Shambaugh
Susan Lucente
Katya Samoteskul

Climate Goal Team

Improved Scientific Understanding Objective

Lead: Rick Rosen (OAR/CPO)
Jim Butler (OAR/ESRL/GMD)
A. Ravishankara (OAR/ESRL/CSD)
David Legler (OAR/CPO)
Jim Todd (OAR/CPO)
Don Anderson (OAR/CPO)
V. Ramaswamy (OAR/GFDL)
Roger Pulwarty (OAR/CPO)
Janet Intrieri (OAR/ESRL/PSD)
Coordinator: Sandy Lucas (OAR/CPO)

Assessment Services Objective

Lead: TBD
Marty Hoerling (OAR/ESRL/PSD)
Adam Parris (OAR/CPO)
Caitlin Simpson (OAR/CPO)
Don Anderson (OAR/CPO)

Mitigation and Adaptation Services Objective

Co-Leads: Joshua Brown (OAR/Sea Grant), Danielle Swallow (NESDIS/NCDC)
Coordinator: Nell Codner (NOS/CSC)

Climate Literacy Objective

Lead: David Herring (OAR/CPO)
Caitlyn Kennedy (OAR/CPO)
Frank Niepold (OAR/CPO)
LuAnn Dahlman (OAR/CPO)

AA Climate Goal Board Projects:
Water Resources, Coastal Inundation, Weather Extremes, Marine Ecosystems
(Roger Pulwarty) **(Paul Scholz)** **(Stephanie Herring)** **(Roger Griffis)**

Regional
Labs, Offices, and Programs

Trends and Implications for CPO

Trends:

- Rising demand for climate services in emerging sectors
  - Health
  - Coasts
  - Hydropower
  - Private sector
- Dramatic changes in the extreme events
  - Floods and droughts
  - Heat and cold waves
  - Hurricanes
  - Tornadoes
- Decline of Arctic sea ice
- Man-made heat-trapping gases are warming the planet
  - (e.g. CO2, hydroflourocarbons)
- Increasing need to communicate impacts of a changing climate
- Continuing uncertain budget environment

Implications:

- A flexible research enterprise that is responsive to changing partner & customer needs
- Long-term, high wuality observations to support climate monitoring, research and services
- Climate research and modeling that fosters new applications in climate risk management and adaptation efforts
- Greater emphasis on climate information services to improve public climate literacy and decision making
- Products of increasing accuracy and timeliness